PROJECT NUMBER: 1308
PROJECT TITLE: Papermaking Process Development
PROJECT LEADER: R. M. Rogers
PERIOD COVERED: November, 1989

I. HANDSHEET PRODUCTION

A. **Objective**: Develop proprietary cigarette papers for low sidestream and other new product applications.

B. **Results**: The latest samples of hydromagnesite, prepared in-house, were incorporated in low porosity sheets at 10% (+ 20% Multifex) to 30%. Commercial samples of this material typically resulted in porous sheets at a 30% inclusion level. The large agglomerates, observed in previous handsheets of 30% pyroaurite ($Mg_6Fe_2(OH)_{16}CO_3$) were eliminated by mixing the filler at high solids level (20%) prior to adding to the paper stock. This mixing technique will be used for future handsheets to improve filler distribution.

Samples of 1/4" cut cellulose acetate (CA) tow from two vendors (Eastman and Celanese) were evaluated for inclusion in web for cigarette filters (75% CA plus refined softwood). Both tow samples were uncrimped at approximately 2 denier. Only the Eastman sample dispersed easily and formed a uniform sheet with tensile, elongation, and porosity comparable to commercial filter webs. Eastman will produce 300 lbs of cut CA fiber for trials at Maine, tentatively scheduled for mid January, 1990.

Utilizing smoking results from the matrix evaluation, a model has been developed relating various properties of high weight papers (porosity, carbonate level and KH_2PO_4 at 63 gm/m^2) to static burn time and sidestream smoke. Burn rate is now being predetermined using this model.

A number of handsheet techniques are being investigated that apply and incorporate fiber/filler bands in a paper's structure. The objective of this evaluation is to reduce the burn rate of cigarettes in specific zones. Restricting the structural materials to fiber and calcium carbonate should minimize the subjective impact.

C. **Plans**: Continue the production of handsheets to evaluate experimental fillers and burn rate modifiers.

Obtain 300 lbs of cut cellulose acetate from Eastman for pilot trials at Maine.

Develop a process to incorporate structural bands of fiber and/or filler in cigarette paper handsheets.

II. PILOT PRODUCTION

A. **Objective**: Produce pilot quantities (bobbins) of cigarette paper.

B. **Results:** The equipment required for the production of various papers on the RL pilot paper machine has been identified. Mass balance diagrams of both the RL and the University of Maine pilot units have been completed. Justification for this project is based on several aspects. In-house production guarantees confidentially, the RL machine is more suited to larger runs, and since the availability of Maine's facility may change, a defensive posture could prove advantageous.

Follow-up pilot trials at James River demonstrated that typical Marlboro paper (137-1) can be printed with sol-gel and processed through a commercial rotogravure press using a 200 lines/inch cylinder. This pattern applied 0.49 gm/m^2 of dry sol-gel (AlOOH). Since higher rates of addition severely weakened the sheet, greater amounts must be applied with multiple passes.

The precipitated boehmite (AlOOH) produced at Lee Labs is being washed to reduce its chloride concentration to a level acceptable for paper production. A computer simulation of a typical paper machine indicates that a 95% decrease in chloride reduces a machine's whitewater chloride level below 15 ppm and sheet concentration to a level well below 90 ppm. Since commercial papers typically contain 170 $\pm$ 120 ppm chloride, the projected contribution of chloride from the AlOOH should not pose a problem.

Kimberly-Clark completed a series of four high basis weight papers at 63 gm/m^2 to identify the optimum porosity and calcium carbonate level for this model. These sheets were produced under a proprietary agreement with Philip Morris covering high basis weight papers. The papers will be sized by PM to determine the optimum level of KH_2PO_4 required.

A literature search by TIS revealed general information and a few patents for the utilization of tobacco fibers in cigarette papers. Some of these products were actually developed past the pilot stage but large scale commercial production was not achieved. All the processes modified conventional wood/nonwood pulping technology to separate the individual fibers, including screening to remove the undesirable fine fraction. It does not appear that the concept of including tobacco fibers in cigarette papers is proprietary.

C. **Plans:** Complete production of scheduled papers at University of Maine.

Evaluate the line contrast of the polished vergeure roll at Maine.

Issue specific recommendations on the equipment required for production of various papers on the RL machine.

Maine will prepare a proposal to identify the comparative quality of tobacco fibers versus flax fibers.